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INTERSTATE ANTELOPE CONFERENCE

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INTERSTATE ANTELOPE CONFERENCE

1973 TRANSACTIONS

Papers presented at the annual meeting held in Alturas, California on March 12, 1974 are included in these transactions.

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CALIFORNIA DEPARTMENT OF FISH AND GAME

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INTERSTATE AIRPORT - FOUR RINGS

INTERSTATE AIRPORT - FOUR RINGS

INTERSTATE AIRPORT - FOUR RINGS

On May 11, 1966, the following was received from the Bureau of Land Management, Denver, Colorado:

The Bureau of Land Management, Denver, Colorado, has received a letter from the Interstate Airport - Four Rings, dated May 11, 1966, requesting that the Bureau of Land Management, Denver, Colorado, advise the Interstate Airport - Four Rings of the status of the proposed project.

BUREAU OF LAND MANAGEMENT
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INTERSTATE AIRPORT - FOUR RINGS

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TABLE OF CONTENTS

Conference Guideline

Attendance Roster

Annual Reports

CALIFORNIA

NEVADA

OREGON

SHELDON-HART MOUNTAIN REFUGES

Special Reports

Antelope and Livestock on the
Range

J. Yoakum

Chairman:

L. "Bud" Pyshora
California Department of Fish and Game
P. O. Box 1480, Redding, CA 96001

Cover:

L. Pyshora

CONFERENCE GUIDELINES

1. The annual meeting will be held on the second Tuesday in March, at Alturas, California. The 1974 meeting will be held on March 11, 1975.
2. The Chairmanship of the conference will rotate between the four representing agencies. The Nevada Fish and Game Department will provide the 1974 Chairman, with Oregon, B.S.F.W. and California following in that order. The 1974 Chairman will be responsible for conducting the March 1975 meeting.
3. Each contributing agency shall provide 100 unstapled copies of their formal presentation. These shall be on standard 8½ x 11 paper with pages unnumbered, printed single space on one side only, and with a margin of 1½ inches for binding. The first page of the report shall carry the title, author's name, author's title, and organization.
4. The Chairman is responsible for compilation of the Conference Transactions covering that period for which he serves.
5. Transactions will be distributed in accordance with standing requests of participating agencies. Additional requests from other agencies, departments, and bureaus shall be honored at the discretion of the Chairman subject to availability. Added requests received by Conference members should be forwarded to the Chairman with a "Send" or "No Send" recommendation. Distribution of the 1973 Transactions was as follows:

<u>AGENCY</u>	<u>NO. COPIES</u>
California Department of Fish and Game 1416 Ninth Street Sacramento, CA 95814	15
Nevada Fish and Game Department P. O. Box 10678 Reno, Nevada 89510	15
Oregon State Game Commission P. O. Box 3503 Portland, Oregon 97208	15

CONFERENCE CHARTER

1. The annual meeting will be held on the second Tuesday in March, at Astoria, Oregon. The 1976 meeting will be held on March 11, 1975.
2. The Chairmanship of the conference will rotate among the three participating agencies, Oregon, Nevada and Idaho, in the following order: Oregon, 1975; Nevada, 1976; Idaho, 1977.
3. The Chairmanship will be responsible for conducting the conference, including the selection of the site, the program, the speakers, the registration, the transportation, the meals, and the other details of the conference.
4. The Chairmanship will be responsible for the preparation of the report of the conference, which will be submitted to the three participating agencies.
5. The Chairmanship will be responsible for the preparation of the budget for the conference, which will be submitted to the three participating agencies.
6. The Chairmanship will be responsible for the preparation of the minutes of the conference, which will be submitted to the three participating agencies.
7. The Chairmanship will be responsible for the preparation of the agenda for the conference, which will be submitted to the three participating agencies.
8. The Chairmanship will be responsible for the preparation of the list of participants, which will be submitted to the three participating agencies.
9. The Chairmanship will be responsible for the preparation of the list of speakers, which will be submitted to the three participating agencies.
10. The Chairmanship will be responsible for the preparation of the list of topics, which will be submitted to the three participating agencies.

NO. 1001

Nevada Fish and Game Department
Portland, Oregon 97201
March 11, 1975
Oregon State Game Commission
Portland, Oregon 97201
Idaho Department of Fish and Game
Boise, Idaho 83720

<u>AGENCY</u>	<u>NO. COPIES</u>
Bureau of Land Management Federal Office Building 2800 Cottage Way, Room E-2820 Sacramento, CA 95825	4
Bureau of Land Management 300 Booth Street Reno, Nevada 89502	6
Bureau of Land Management P. O. Box 2965 Portland, Oregon 97208	5
Modoc National Forest Alturas, CA 96101	6
Fremont National Forest P. O. Box 551 Lakeview, Oregon 97630	2
Bureau of Sport Fisheries and Wildlife P. O. Box 111 Lakeview, Oregon 97630	10
National Park Service Klamath Falls Group P. O. Box 128 Klamath Falls, Oregon 97601	2

6. The current Chairman shall notify the following as to the time and place of the Conference. These individuals will have the responsibility for notifying those interested parties in his particular jurisdiction as to the time and place of the meeting.

<u>NAME</u>	<u>AGENCY</u>	<u>ADDRESS</u>
Director	Nevada Fish and Game Department	P. O. Box 10678 Reno, Nevada 89510
Paul Ebert	Oregon State Game Commission	P. O. Box 3503 Portland, Oregon 97208
Dave Luman	Bureau of Land Management	P. O. Box 2965 Portland, Oregon 97208
Vic Masson	Oregon State Game Commission	P. O. Box 8 Hines, Oregon 97738
Stan Thompson	California Department of Fish and Game	P. O. Box 1480 Redding, CA 96001

<u>NAME</u>	<u>AGENCY</u>	<u>ADDRESS</u>
Refuge Manager	Sheldon-Hart Mountain Refuges	P. O. Box 111 Lakeview, Oregon 97630
Refuge Manager	Klamath Basin National Wildlife Refuges	Route 1, Box 74 Tulelake, CA 96134
Superintendent	Lava Beds National Monument	P. O. Box 867 Tulelake, CA 96134
Forest Supervisor	Fremont National Forest	P. O. Box 551 Lakeview, Oregon 97630
W. M. Shaw	Idaho Department of Fish and Game	P. O. Box 25 Boise, Idaho 83707
Bill Radtky	Bureau of Land Management	Federal Office Building 2800 Cottage Way Room E-2820 Sacramento, CA 95825
Forest Supervisor	Modoc National Forest	Alturas, CA 96101
Jim Yoakum	Bureau of Land Management	300 Booth Street Reno, Nevada 89502
Superintendent	National Park Service Klamath Falls Group	P. O. Box 128 Klamath Falls, Oregon 97601

ATTENDANCE ROSTER

<u>NAME</u>	<u>AGENCY</u>	<u>ADDRESS</u>
Bloom, Clark	Fish and Wildlife Service	Alturas, CA
Bolander, Don	Forest Service	Alturas, CA
Bright, Larry	Oregon Wildlife Commission	Summer Lake, OR
Carter, Pete	Fish and Wildlife Service	Lakeview, OR
Escano, Ron	Forest Service	Tulelake, CA
Fisher, Leon	Forest Service	Alturas, CA
Hess, Mike	Nevada Fish and Game	Reno, Nevada
Koss, Duane	Sheldon Refuge, USFWS	Lakeview, OR
Masson, Ellis	Oregon Wildlife Commission	Hines, OR
Masson, Vic	Oregon Wildlife Commission	Hines, OR
O'Neill, Ed	Fish and Wildlife Service	Tulelake, CA
Pyshora, Leo	California Fish and Game	Redding, CA
Richardson, Jack	Fish and Wildlife Service	Lakeview, OR
Sarvis, John	Fish and Wildlife Service	Plush, OR
Styskel, Ed	Forest Service	Lakeview, OR
Thayer, Douglas J.	California Fish and Game	Alturas, CA
Thompson, Stan	California Fish and Game	Redding, CA
Yoakum, Jim	Bureau of Land Management	Reno, Nevada

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

I. Herd Surveys

A. Annual Census

California's annual antelope census procedure has changed very little since 1953. The census technique involves overflights on all known antelope winter ranges in northeastern California. A complete count of all antelope is attempted. A pilot and two observers are used on all flights. The airplane used in 1974 was a Cessna 185 equipped with a Robertson STOL device.

California's annual aerial census was conducted on January 28, 29, and 30, 1974. The ground was snow free at this time. Light conditions for counting purposes were excellent. Antelope were concentrated on winter ranges in many groups. Most groups contained less than 100 animals, which facilitated counting.

Four thousand seven hundred forty-seven (4,747) antelope were counted in the basic California population during the 1974 census. No antelope were found on interstate ranges east of the Warner Mountains.

The 1974 count was 390 antelope, or nine percent, over the 1973 count. This is the highest count since the present census method was adopted in 1953.

The basic California population has increased by 2,967 antelope, or 167 percent since 1960. The lowest count recorded occurred in 1960 with 1,780 antelope being counted.

B. Buck Doe Ratio

The aerial herd composition survey technique has remained basically unchanged since it was developed in 1954. This technique involves flying over summer ranges and classifying, as bucks, does or kids, all antelope observed. The same type of aircraft and number of personnel are used on both the summer herd composition survey and the winter census.

The 1973 herd composition survey in northeastern California was conducted August 8, 9, 10 and 11. The 1973 survey was conducted several weeks later than the 1972 survey. Due to airplane scheduling difficulties, all known antelope summering areas were not checked as was done during previous surveys.

Two thousand seven hundred sixty-nine (2,769) antelope were classified in 1973. The buck ratio was 34 bucks per 100 does. This is 1 buck per 100 does over the 1972 ratio, but is 3 bucks per 100 does below the previous five-year average.

C. Production

The kid to doe ratio is obtained during the summer herd composition counts. The 1973 count was 42 kids per 100 does. This count was 13 kids per 100 does below the 1972 count and 16 kids per 100 does below the previous five-year average.

D. Harvest

The tenth consecutive antelope hunt in northeastern California was held in 1973. Season dates were August 25 through September 3. Three hundred eighty-five (385) permits were issued at a statewide drawing held in Sacramento. Permits were valid for one adult male antelope and cost \$15.00. There were five more permits issued in 1973 than were issued in 1972. The hunt area, as in past years, was divided into seven zones as a proven method of distributing hunting pressure and antelope kill.

The reported kill for the 1973 season was 305 adult male antelope. Hunter success was 79 percent, the same as in 1972. Hunter success for the 10 consecutive hunts has ranged from 59 to 80 percent with an average of 73 percent.

Successful hunters were required to return the report card portion of their tag to the Department of Fish and Game. Unsuccessful hunters were required to return both the report card and the tag to the Department. Therefore, the reported kill is correct.

The number of yearlings in the kill increased from 14 percent in 1972 to 29 percent in 1973. During the past eight hunts (1966 through 1973) the percent of yearlings in the kill has ranged from 12 to 30 percent. The percent of bucks four years and older killed during the same hunts has ranged from 28 to 42 percent.

The hunting permit quotas, except for the Surprise Valley area, are based on 75 percent of the surplus bucks. Surplus bucks are those over and above the minimum needed for breeding purposes. The minimum needed for breeding purposes has been arbitrarily set at 20 bucks per 100 does. As antelope summering in the Surprise Valley area will often winter in Nevada, permit quotas are based on summer herd composition data only.

An antelope hunting session was again held in Alturas on the day before the hunt began. Attendance at the session was on a voluntary basis. Information was provided to the hunters on: objectives of the hunt, selection and scoring of trophies, hunting procedures, care of antelope killed, laws and regulations, life history and history of antelope. There were 149 people in attendance at the 1973 session, at least 103 of these were permit holders. Comments received from the hunters indicate that the session is one of the highlights of their hunt.

D. Harvest

During the past ten years there have been 2,990 antelope permits issued in California. Hunters have reported taking 2,205 adult male antelope. During this same period California's antelope population has increased by 81 percent.

II. Range Surveys

A. Weather Conditions

Seasonal precipitation was below normal. Snowfall on winter ranges was relatively light during the winter of 1972-73. Extreme cold weather occurred during early December 1972 with minimum temperature reaching 34 degrees below zero in Alturas. Spring months were characterized by below normal precipitation and temperatures.

B. Range Modification

None specifically for antelope.

C. Range Evaluation

Overall range conditions for 1972-73 were considered to be poor to fair.

III. Miscellaneous

A. Disease

No disease occurrences were reported.

B. Tagging

No tagging was done.

IV. Summary

The 1974 census showed 4,747 antelope in the basic California population. This is an increase of 390 antelope, or nine percent, over the 1973 count. California's antelope population has increased by 2,967 animals, or 167 percent since 1960.

The 1973 buck-doe ratio was 34 bucks per 100 does, an increase of 1 buck per 100 does over the 1972 ratio. The 1973 kid ratio was 42 kids per 100 does. This count was 13 kids per 100 does below the 1972 count, 16 kids per 100 does below the previous five-year average.

The tenth consecutive adult buck only hunt was held. Three hundred eighty-five (385) permits were issued. Hunters reported killing 305 antelope.

Hunter success was 79 percent, the same as in 1972. Hunter success for the ten hunts has averaged 73 percent.

The following tables show current data with comparative information from previous years.

During the past ten years there have been 1,900 antelope permits issued in California. Hunters have reported killing 302 antelope. The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population.

II. Range Evaluation

Antelope range evaluation was below normal. Snowfall in winter ranges was relatively low. The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population.

C. Range Evaluation

Overall range conditions for 1972-73 were considered to be poor to fair. The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population.

III. Management Recommendations

Antelope range management was reported. The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population.

IV. Summary

The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population. The 1972 census showed a 10% increase in the antelope population.

TABLE I

Winter Aerial Census in Northeastern California

Year	Total Counted	*Erratic Winter Populations	Basic California Populations
1953	2247	122	2125
1954	2022	172	1850
1955	2137	180	1957
1956	2338	0	2338
1957	2080	107	1973
1958	2165	0	2165
1959	1917	0	1917
1960	1961	181	1780
1961	2068	162	1906
1962	2354	85	2269
1963	2498	123	2375
1964	2618	0	2618
1965	2468	0	2468
1966	2898	163	2735
1967	2665	128	2537
1968	2607	0	2607
1969	2971	101	2870
1970	2999	16	2983
1971	3800	0	3800
1972	3764	0	3764
1973	4357	0	4357
1974	4747	0	4747

*Erratic winter populations occupying interstate ranges east of the Warner Mountains subtracted from total, leaves the basic California population.

TABLE I

Winter 1971 Census in Northern California
 Winter 1971 Census in Northern California

Year	Counted	Estimated	California Populations
1971	2147	177	10
1972	4023	140	100
1973	2147	177	1000
1974	2738	163	1100
1975	2080	90	1100
1976	2147	177	1180
1977	2147	177	1180
1978	2147	177	1180
1979	2147	177	1180
1980	2147	177	1180
1981	2147	177	1180
1982	2147	177	1180
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2004	2147	177	1180
2005	2147	177	1180
2006	2147	177	1180
2007	2147	177	1180
2008	2147	177	1180
2009	2147	177	1180
2010	2147	177	1180
2011	2147	177	1180
2012	2147	177	1180
2013	2147	177	1180
2014	2147	177	1180
2015	2147	177	1180
2016	2147	177	1180
2017	2147	177	1180
2018	2147	177	1180
2019	2147	177	1180
2020	2147	177	1180

*Winter 1971 census populations occupying
 the Sierra Nevada Mountains and adjacent
 California population.

TABLE II

Antelope Herd Composition Summary

Year	Population	Bucks:Does:Kids			No. Classified
1954	1850	58	100	84	689
1955	1957	52	100	77	1020
1956	2338	51	100	57	927
1957	1973	58	100	66	861
1958	2165	59	100	70	1390
1959	1917	46	100	53	1496
1960	1780	32	100	39	1079
1961	1909	44	100	64	1042
1962	2269	39	100	42	1493
1963	2375	44	100	62	1721
1964	2618	47	100	57	1918
1965	2468	44	100	52	1592
1966	2735	35	100	40	1718
1967	2537	40	100	58	1963
1968	2607	39	100	61	2025
1969	2870	37	100	69	2336
1970	2983	35	100	63	2779
1971	3800	41	100	40	3089
1972	3764	33	100	55	3289
1973	4357	34	100	42	2769

Year	Population	Stags	Does	Kids	No. Classified
1972	4557	36	100	43	2768
1973	3746	33	100	55	2388
1974	3800	41	100	40	2088
1975	3583	35	100	63	2719
1976	3870	37	100	69	2356
1977	3607	39	100	61	2053
1978	3537	40	100	58	1967
1979	3473	33	100	71	1718
1980	3068	44	100	71	2568
1981	3287	41	100	70	2580
1982	3272	37	100	67	2018
1983	3272	44	100	63	2020
1984	3272	47	100	60	1818
1985	3272	41	100	71	2580
1986	3272	41	100	71	2580
1987	3272	41	100	71	2580
1988	3272	41	100	71	2580
1989	3272	41	100	71	2580
1990	3272	41	100	71	2580
1991	3272	41	100	71	2580
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2094	3272	41	100	71	2580
2095	3272	41	100	71	2580
2096	3272	41	100	71	2580
2097	3272	41	100	71	2580
2098	3272	41	100	71	2580
2099	3272	41	100	71	2580
2100	3272	41	100	71	2580

TABLE III

Buck Antelope Kill by Season

Year	Permits Issued	Reported Kill	Hunter Success Ratio
1942	500	405	.81
1943	500	362	.72
1944	500	322	.64
1945	500	307	.61
1949	500	349	.70
1951	416	280	.67
1959	171	120	.70
1964	240	183	.76
1965	240	141	.59
1966	265	179	.68
1967	250	159	.64
1968	260	189	.73
1969	270	204	.76
1970	300	241	.80
1971	400	303	.76
1972	380	301	.79
1973	385	305	.79

Table I represents the five-year population trend by unit. Figure 1 represents the total northwestern Nevada population trend counts for the eleven-year period 1965 through 1973.

B. Sex-Age Ratio

A sex-age ratio of 38 bucks per 100 does was obtained during 1973 census production surveys. This represents an increase over the 1972 ratio of 34/100, but not an increase in actual numbers since four bucks were classified in the census of 1973.

C. Production

A total of 1,343 antelope were classified during aerial production surveys conducted in early August. Of this sample, the composition was 517 bucks, 513 does and 313 kids which yields a ratio of 38/100/39. Production again increased from the previous year, but remains well below average. Table II summarizes 1973 production by unit. Figure 2 represents the annual production ratios for the eleven-year period 1965-1973.

TABLE VII
Buck Anderson's Back Against the Wall by Season

Year	Points Scored	Rebounds	Assists	Steals	Blocks	Turnovers	Success Ratio
1942	1000	402	401	81			19.1
1943	1700	362	362	72			17.1
1944	1700	322	322	64			17.4
1945	12500	307	307	61			16.1
1946	10000	342	342	70			17.0
1947	10000	380	380	67			16.7
1948	10000	410	410	70			17.0
1949	10000	410	410	70			17.0
1950	10000	410	410	70			17.0
1951	10000	410	410	70			17.0
1952	10000	410	410	70			17.0
1953	10000	410	410	70			17.0
1954	10000	410	410	70			17.0
1955	10000	410	410	70			17.0
1956	10000	410	410	70			17.0
1957	10000	410	410	70			17.0
1958	10000	410	410	70			17.0
1959	10000	410	410	70			17.0
1960	10000	410	410	70			17.0
1961	10000	410	410	70			17.0
1962	10000	410	410	70			17.0
1963	10000	410	410	70			17.0
1964	10000	410	410	70			17.0
1965	10000	410	410	70			17.0
1966	10000	410	410	70			17.0
1967	10000	410	410	70			17.0
1968	10000	410	410	70			17.0
1969	10000	410	410	70			17.0
1970	10000	410	410	70			17.0
1971	10000	410	410	70			17.0
1972	10000	410	410	70			17.0
1973	10000	410	410	70			17.0
1974	10000	410	410	70			17.0

NORTHWESTERN NEVADA ANTELOPE STUDIES
MIKE HESS
GAME AGENT II
NEVADA DEPARTMENT OF FISH AND GAME

I. HERD SURVEYS

A. Annual Census

Aerial surveys conducted in March, 1973, resulted in a record count of 1,879 antelope. This represents an increase of 276 animals or 17% over the 1972 census. The majority of the increase was encountered in the Hart Camp Unit which exhibited a 65% increase. No antelope were found in the New Year Lake Unit, but 111 animals which were located in the northwest portion of the Hart Camp Unit along the California border south of Fortynine Pass, were felt to have been from New Year Lake. All other unit totals remained similar to 1972.

Although the total count obtained in the 1973 census was higher than ever before experienced, antelope were generally more difficult to locate and more flight time was required to obtain samples in most units. Snow and wet ground conditions on the normal wintering areas had apparently forced the antelope onto other areas. Also, the antelope were in larger groups and less dispersed.

Table I represents the five-year population trend by unit. Figure I represents the total northwestern Nevada population trend counts for the sixteen-year period 1958 through 1973.

B. Buck-Doe Ratio

A buck-doe ratio of 38 bucks per 100 does was obtained during 1973 summer production surveys. This represents an increase over the 1972 ratio of 34/100, but not an increase in actual numbers since fewer bucks were classified in the summer of 1973.

C. Production

A total of 1,543 antelope were classified during aerial production surveys conducted in early August. Of this sample, the composition was 331 bucks, 873 does and 339 kids which yields a ratio of 38/100/39. Production again increased from the previous year, but remains well below average. Table II summarizes 1973 production by unit. Figure 2 represents the annual production ratios for the sixteen-year period 1958-1973.

Population trend counts and production surveys have generally all been accomplished using either Departmental or rented fixed wing aircraft. The type of aircraft and number of observers has varied. In some instances, ground surveys were used supplantarily.

In 1973, the Departmental helicopter, a turbocharged Bell 4763-1, was used to classify antelope in the Smoke Creek Unit for production trend. Several subjective observations can be made comparing this technique with fixed wing surveys. Logistics presents some problem in rural areas where gasoline must be transported to landing areas and a back-up vehicle for this purpose is required. Antelope do not appear to be noticeably more distressed by the helicopter. Time involved in classifying a particular group is usually considerably shorter and normally a single pass is adequate. Accuracy is greatly improved, since the slower flight speed allows observers more time. Younger age class bucks are more easily identified. The slower flight speed does preclude efficient surveys in areas of low antelope densities.

Simple linear regression analysis (Figure 3) indicated that the population trend count and the annual production ratios obtained in the same years were negatively correlated ($P < .01$). In the years that higher population trend counts were obtained significantly lower production ratios occurred, and during those years where lower population trend counts were obtained significantly higher production ratios occurred. This suggests density-dependent factors are influencing productivity in the northwestern Nevada antelope population. Which density-dependent factors are operable is not obvious from present data and further investigations are warranted.

During recent years, more intensive efforts have been made to locate animals during the population trend counts resulting in abnormally higher counts. This has introduced a bias which has somewhat lowered the correlation coefficient.

D. Harvest

The 1973 regular antelope season ran from August 25 through September 4. Demand for tags was considerably higher in 1973 due to administrative changes in the application procedure. A total of 2,846 applications were received for the 350 tags available on a statewide basis. Within the units covered in this report, a total of 250 tags were available. This represents a net loss of ten tags due to adjustments made in three of the units to both improve hunting quality and to compensate for apparent unit population changes.

A total of 248 tag holders reported harvesting 197 antelope for an overall success of 80% which is essentially equal to 1972 hunt results. Return cards were not received from two hunters and two

reported that they failed to hunt. Table III summarizes the 1973 harvest by unit.

Again in 1973, an antelope archery hunt was held with 100 tags available. Two animals were reported taken in northwestern Nevada.

A check station was operated at Gerlach during the opening weekend of the regular season. Objectives were to examine harvested animals to determine trophy quality and establish age classes taken. A total of 53 antelope were measured to green Boone and Crockett Club scores at this station. Scores were received on an additional five animals after the season. Each animal was aged when possible using incisor replacement and an incisor was extracted for later sectioning. Field dressed weights were taken to the nearest pound.

The average Boone and Crockett score for 58 animals taken in northwestern Nevada was 67 $\frac{2}{8}$ with a range from 46 $\frac{7}{8}$ to 79 $\frac{2}{8}$. A total of 41 animals were positively aged using incisor replacement. Of these, 9.7% were yearlings, 21.9% were two-year olds, 26.8% were three-year olds, and 41.5% were four or older. In comparing trophy quality with age, four yearlings had an average Boone and Crockett score of 51 $\frac{1}{8}$, nine two-year olds averaged 61 $\frac{6}{8}$, 10 three-year olds averaged 68 $\frac{5}{8}$ and 15 animals four or older averaged 70 $\frac{3}{8}$. Field dressed weights were obtained from 39 antelope with an average of 93 $\frac{1}{2}$ pounds and a range from 76 to 116 pounds. Sectioning on the collected incisors has not yet been accomplished.

II. RANGE SURVEYS

A. Weather-Precipitation

Precipitation averaged near normal in northwestern Nevada, but as in 1972, distribution by season was irregular. The spring and summer was particularly dry. Weather during the kidding period was mild. During the production surveys, the antelope had generally left even those areas which normally retain some succulent vegetation during that period such as some of the playas. The antelope were often found at higher elevations and appeared to be heavily utilizing bitterbrush.

B. Range Modifications

Brush spraying was again limited to smaller parcels of private land.

No formal evaluation of establishment by exotic forbs in certain seedings was attempted. Casual observations concluded that although some establishment has occurred, plant vigor was usually poor and reproduction appeared lacking.

The U.S. Forest Service burned an additional 2,000 acres of big sage type in the Santa Rosa Mountains. Forb and grass response in the 200 acres burned in 1972 was excellent. Also, crown sprouting was noted in most brush species. Observations and evaluation of wildlife responses will continue.

C. Range Evaluations

Rotation grazing systems are continuing to be planned and implemented. In operating systems, responses by antelope have not as yet been noted, and again as in 1972, browse response, but not yet forbs, is occurring.

III. MISCELLANEOUS EVALUATION

A. Disease

None was reported in 1973.

B. Predation

No direct observations of active predation were made or reported in 1973. Coyote populations appear to have declined somewhat in all antelope units. No control measures were undertaken in 1973, although the collection of stomach samples was made again on the Owyhee Desert. Six samples were obtained and antelope kid remains occurred in one of these.

C. Food Habits

Rumen samples from 1969 remain unanalyzed.

IV. SUMMARY OF DATA

- A. Antelope populations remain at a high level.
- B. Production improved slightly, but remained low.
- C. A negative correlation appears to exist between population size and productivity.
- D. Harvest levels remained stable.
- E. Range condition remained stable. Possibly some improvement due to grazing systems is occurring.
- F. Predator influences remain undetermined.

V. RECOMMENDATIONS

- A. Continue to emphasize quality in antelope hunting.
- B. Continue to attempt to determine the impact of all density-dependent variables (predators, range, disease, etc.).

C. Initiate analysis of on-hand rumen samples and collect samples during other seasons.

D. Determine seasonal movement patterns and extent of seasonal ranges.

UNIT	1969	1970	1971	1972	1973
New Year Lake	0	30	8	119	0
Hart Camp	470	220	490	366	924
Snake Creek	29	341	639	339	336
Summit Lake	139	140	146	200	234
Kings River	153	131	158	182	154
Santa Rosa	125	158	210	220	229
TOTAL:	1,146	1,179	1,711	1,603	1,879

TABLE II
RUMEN COMPOSITION (1973)

UNIT	NO. CLASSIFIED	W/L	W/F	K/L	B/100 D	K/100 D
New Year Lake	128	14	34	30	17	37
Hart Camp	888	101	300	97	36	12
Snake Creek	641	151	267	143	57	53
Summit Lake	81	70	55	15	18	27
Kings River	98	17	59	22	29	37
Santa Rosa	177	35	107	32	26	20
TOTAL:	1843	388	873	339	50	39

TABLE III
HARVEST (1973)

UNIT	REL. TAGS	RETURNS	HARVEST	ON-SUCCESSFUL	W/L NOT FOUND	% SUCCESS
New Year Lake	35	34	22	12	0	60
Hart Camp	55	55	98	6	1	21
Snake Creek	50	50	63	7	0	36
Summit Lake	35	34	27	7	0	79
Kings River	20	20	11	9	0	55
Santa Rosa	25	23	18	8	1	67
Sweden	20	20	20	0	0	100
TOTAL:	240	246	247	49	2	90

TABLE I
POPULATION TREND

<u>UNIT</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>
New Year Lake	0	80	6	119	0
Hart Camp	670	320	490	566	924
Smoke Creek	59	343	699	338	338
Summit Lake	139	140	146	200	234
Kings River	153	131	158	152	154
Santa Rosa	125	159	218	228	229
TOTAL:	1,146	1,173	1,717	1,603	1,879

TABLE II
HERD COMPOSITION (1973)

<u>UNIT</u>	<u>NO. CLASSIFIED</u>	<u>BUCK</u>	<u>DOE</u>	<u>KID</u>	<u>B/100 D</u>	<u>K/100 D</u>
New Year Lake	128	14	84	30	17	37
Hart Camp	498	101	300	97	34	32
Smoke Creek	561	151	267	143	57	54
Summit Lake	81	10	56	15	18	27
Kings River	98	17	59	22	29	37
Santa Rosa	177	38	107	32	36	30
TOTAL:	1543	331	873	339	38	39

TABLE III
HARVEST (1973)

<u>UNIT</u>	<u>NO. TAGS</u>	<u>RETURNS</u>	<u>HARVEST</u>	<u>UN-SUCCESSFUL</u>	<u>DID NOT HUNT</u>	<u>% SUCCESS</u>
New Year Lake	35	34	22	12	0	65
Hart Camp	65	65	58	6	1	91
Smoke Creek	50	50	43	7	0	86
Summit Lake	35	34	27	7	0	79
Kings River	20	20	11	9	0	55
Santa Rosa	25	25	16	8	1	67
Sheldon	20	20	20	0	0	100
TOTAL:	250	248	197	49	2	80

FIGURE 1

ANTELOPE POPULATION TREND COUNT
1958 - 1973

MANAGEMENT AREAS
1A, 1B, 1C, 3A, 3B&5

ANNUAL AVERAGE = 1256.13

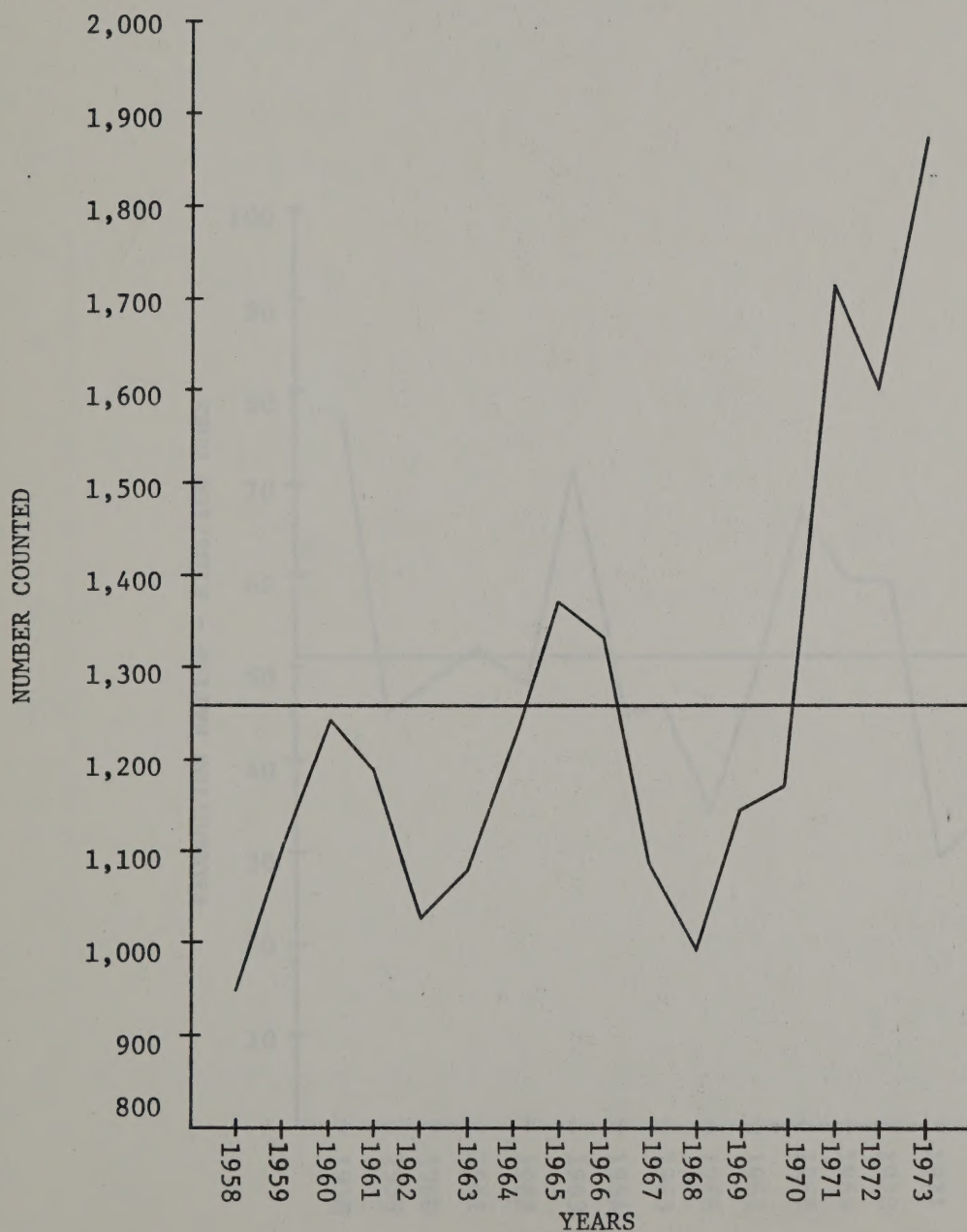


FIGURE 2

ANTELOPE PRODUCTION RATIOS
Kids/100 Does
1958 - 1973

MANAGEMENT AREAS
1A, 1B, 1C, 3A, 3B&5

ANNUAL AVERAGE = 50.19

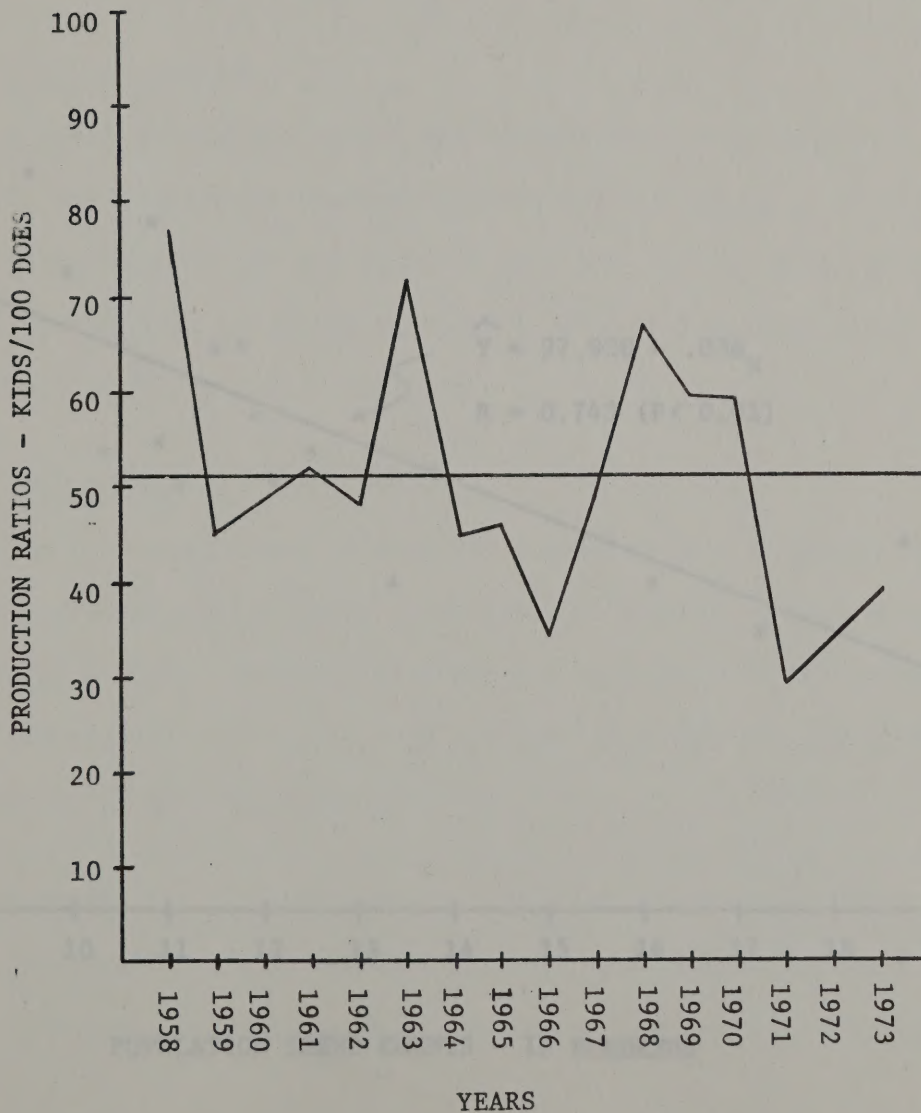
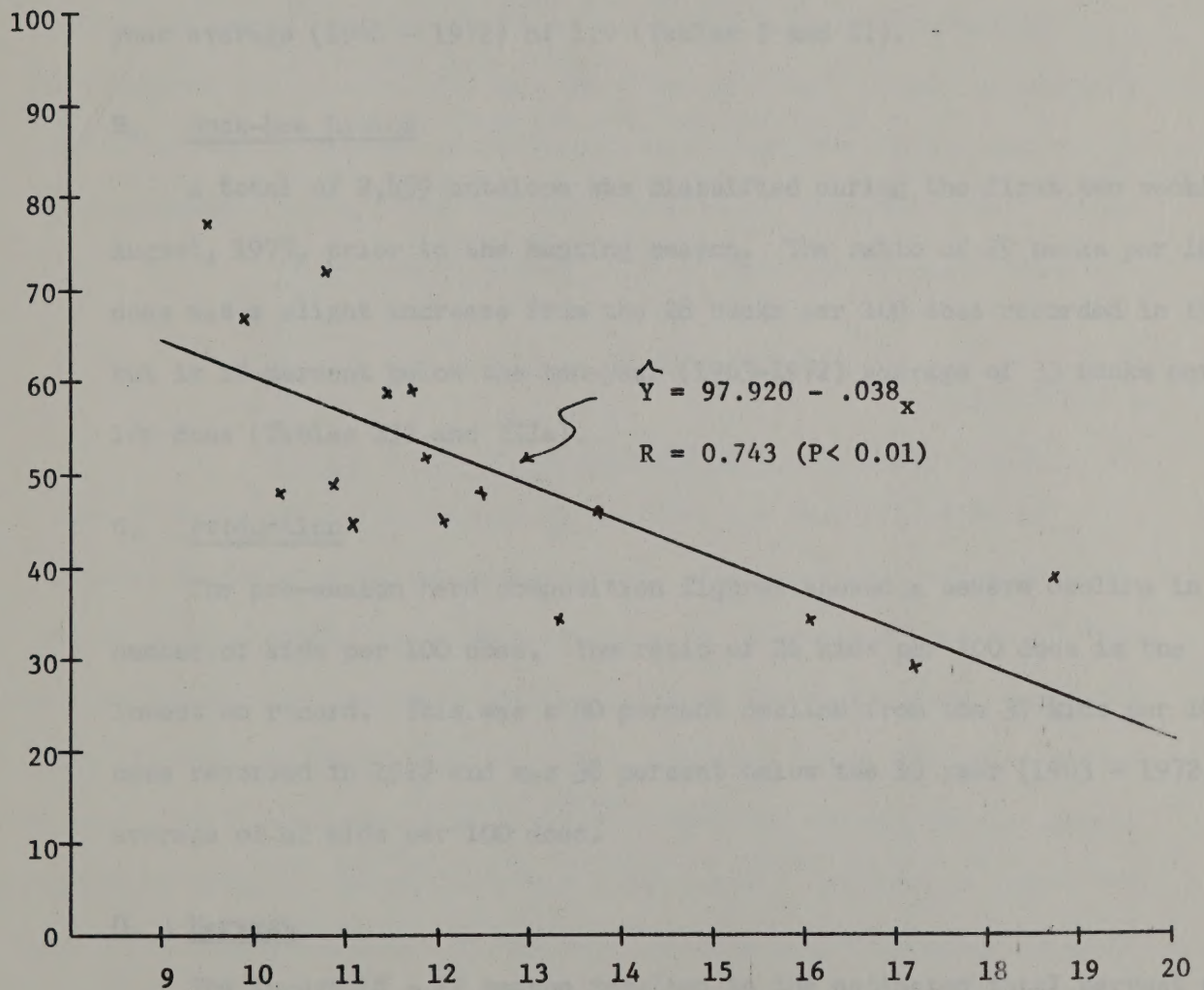


FIGURE 3



POPULATION TREND COUNTS - IN HUNDREDS

OREGON ANTELOPE REPORT, 1973

Al Polenz, Biologist
Oregon Wildlife Commission

I. Herd Surveys

A. Annual Census

The 1973 aerial census, conducted during February and March, revealed a record number of 9,270 antelope observed on the 4,090 miles of aerial inventory routes. This year's average of 2.3 antelope per mile is 9.0 percent above the 1972 figure of 2.1 and is 20 percent above the five year average (1968 - 1972) of 1.9 (Tables I and II).

B. Buck-Does Ratios

A total of 2,459 antelope was classified during the first two weeks of August, 1973, prior to the hunting season. The ratio of 29 bucks per 100 does was a slight increase from the 28 bucks per 100 does recorded in 1972, but is 12 percent below the ten-year (1963-1972) average of 33 bucks per 100 does (Tables III and IIIa).

C. Production

The pre-season herd composition figures showed a severe decline in the number of kids per 100 does. The ratio of 26 kids per 100 does is the lowest on record. This was a 30 percent decline from the 37 kids per 100 does recorded in 1972 and was 38 percent below the 10 year (1963 - 1972) average of 42 kids per 100 does.

D. Harvest

The August 18 - 22 season resulted in the estimated total harvest of 749 buck antelope. This was a slight decrease from the 764 antelope harvest in 1972.

A total of 1,615 tags was issued for the general season and an additional 65 antelope archery tags were issued for the Gerber Reservoir area in Klamath County.

The antelope archery season was extended three days to August 26. Report card returns showed 34 archers taking two antelope averaging 6 percent success. A follow up mail survey revealed 51 archery hunters took three antelope. Archery hunters were required to have a hunting license, an archery hunting license and a \$3 Gerber Reservoir antelope tag.

Weather conditions during the hunting season were normal but water shortages in Lake, Deschutes and Crook counties, due to the unusually dry winter and spring, did cause some distribution changes in some antelope herds. Hunter success for 1973 was reported as 53 percent compared to 60 percent success reported in 1972 (Tables IV and V).

II. Range Surveys

A. Weather Conditions - Precipitation

The 1972-73 winter was very mild except for a severe two week cold spell in early December, 1972. Temperatures during this period reach a -35° F. on many ranges, but this had no observable adverse effect on the antelope. Little snow was on the ground at the time. All ranges received less than normal spring moisture, but there was sufficient snowfall and spring rain to produce adequate forage and allow some runoff into many of the desert waterholes. Consequently the antelope were allowed to distribute themselves normally over most of their summer ranges. Waterholes in some areas did dry up by mid to late summer resulting in a redistribution of antelope in those localities.

B. Range Modification

Range vegetation conversion projects continue in southeastern Oregon, but wildlife interests are now being more fully considered in the design of all projects on public land. As reported last year, the impact of many of these projects remain largely unknown.

Several wildfires burned large acreages of sagebrush lands during the Summer of 1973, however, few of the burned lands were occupied by any number of antelope. The two large burn areas which have supported antelope in the past were:

1. Dairy Pasture Fire, Malheur County

- a. 54,800 acres burned
- b. 25,000 acres planned for seeding
- c. Plant species to be seeded:
 - Crested wheatgrass
 - Nomad alfalfa
 - Sweet clover
- d. 50 - 75 antelope summer on the area.

2. Double Strike Fire, Harney County

- a. 10,000 acres burned
- b. 9,700 acres seeded
- c. Plant species seeded:
 - Crested wheatgrass
 - Nomad alfalfa
 - Sweet clover
 - Rye (200 acres)
- d. Approximately 80 antelope summer in this area

More intensive work (mainly observation) than normal will be expended on these two burn areas for the next few years in an attempt to determine the impact that these rehabilitated burns may have on the resident antelope herd. Observations in Lake County indicate that rehabilitated burns are

more attractive to antelope than the normal range rehabilitation projects.

Drakes Flat Antelope Range Seeding*

This is an 80 acre test project begun in April 1970. Twenty-one species of grasses, legumes and browse were seeded to test their response on typical low sagebrush antelope range. Observations through the 1973 growing season show most legumes disappearing. Nomad alfalfa appears to be one of the better adapted and more persistent legumes.

Small burnett is still maintaining itself, but antelope use has been light. Most grass species that established themselves early are still doing well. Russian wildrye shows a generally better forage production than the other grasses. This species appears somewhat difficult to establish and use by antelope has been light.

III. Miscellaneous

A. Diseases, Parasites, Predation

No evidence of mortality from these causes was found.

B. Bear Valley Antelope Herd

Monitoring of this herd of approximately 225 antelope continues.

Forty-one kids (19 males and 22 females) have been captured and marked in Bear Valley since 1971. To date, none of the marked animals has yet shown in the hunter harvest or on the winter range.

Total population of this herd apparently has leveled off for the present at about 225 head. If further growth occurs, problems may develop with the private landowners in the area, see Figure 1.

*Ref. Interstate Antelope Conference, 1971 Transactions.

Another small mountain valley, Summit Prairie in the Ochoco Mountains, supports an antelope herd very similar to the Bear Valley herd. An attempt should be made to determine why these two isolated populations flourish while our desert antelope continue to produce poor kid crops.

IV. Summary

A. The 1973 population index increased nine percent over that of 1972, and was 20 percent above the five year average. A total of 9,270 antelope was counted on 4,090 miles of census routes.

B. The buck ratio increased slightly from 28 bucks per 100 does in 1972 to 29 bucks per 100 does in 1973. Kid production of 26 kids per 100 does was the lowest ever recorded. This was a 30 percent decrease from the 37 kids per 100 does recorded in 1972.

C. Estimated total buck harvest for 1973 was 749, which was a slight decrease from the 764 antelope harvested in 1972. Tags issued for the general season numbered 1,615 with an additional 65 tags being issued to archers. Reported general season hunter success was 53 percent as compared to 60 percent in 1972.

D. Only 51 archers (65 tags issued) reported hunting antelope. Three of the people took buck antelope.

V. Recommendations

- A. Consider providing more man-days of recreation by increasing the length of the annual (bucks only) season and/or issuing an increased number of antelope tags.
- B. Continue to monitor effects of range and fire rehabilitation projects on antelope. The immediate as well as long range impacts should be discovered, analyzed and reported.
- C. Develop interest in investigating and determining causes for the low antelope kid survival on our desert ranges and the relatively high kid survival in Bear Valley and Summit Prairie.
- D. Continue to monitor the Bear Valley and Summit Prairie antelope herds and record its status yearly.

Table 1

1973 AERIAL ANTELOPE INVENTORY

UNIT	DISTRICT	MILES	ANTELOPE	ANTELOPE PER MILE		
				1973	1972	10-year AVERAGE
Beulah	Malheur	175	465	2.7	3.0	2.4
Ft. Rock- Silver Lake	Lake	225	130	0.6	0.5	0.8
Hart Mt.	Harney	900	2133	2.4	2.3	2.4
Interstate	Lake	50	87	1.7	0.9	1.1
Juniper	(Harney	240	557	2.3	1.9	-
	(Lake	50	224	4.5	2.2	-
	(Total	290	781	2.7	1.9	1.3
Malheur	Harney	140	839	2.9	3.8	2.0
Maury	(Deschutes	200	155	0.8	0.9	-
	(Ochoco	125	372	3.0	2.0	-
	(Total	325	527	1.6	1.3	1.6
Murderer's Creek	Harney	40	110	2.8	0	-
Ochoco	Ochoco	125	238	1.9	0.1	1.7
Owyhee	Malheur	225	1017	4.5	3.0	2.3
Paulina - Wagontire	(Deschutes	200	302	1.5	1.7	-
	(Deschutes	250	573	2.3	1.9	-
	(Harney	60	21	0.3	0.7	-
	(Lake	25	183	7.3	1.4	-
	(Total	535	1079	2.0	1.7	1.3
Silvies	(Ochoco	125	187	1.5	2.4	-
	(Harney	60	61	1.0	2.1	-
	(Total	185	248	1.3	2.3	1.2
Steens Mt.	Harney	220	456	2.1	2.4	0.9
Warner	Lake	105	487	4.6	4.4	3.7
Whitehorse	Malheur	550	673	1.2	1.5	1.1
TOTALS & AVERAGES		4,090	9,270	2.3	2.1	1.7

TABLE II

History of Antelope Population Trends			
Year	Antelope observed	Miles traveled	Antelope per mile
1973	9,270	4,090	2.3
1972	8,627	4,075	2.1
1971	8,055	3,375	2.4
1970	8,244	4,150	2.0
1969	6,326	4,150	1.5
1968	7,298	4,250	1.7
1967	7,593	4,125	1.8
1966	6,010	4,000	1.5
1965	5,859	3,775	1.6
1964	6,056	4,205	1.4
1963	6,068	3,900	1.6
1962	3,925	3,905	1.3
1961	3,865	3,445	1.1
1960	5,712	3,725	1.5
1959	5,465	3,645	1.5
1958	4,916	3,694	1.3
1957	4,846	3,644	1.3
1956	2,804	1,949	1.4
1955	4,773	3,343	1.4
1954	7,061	3,589	2.0
1953	5,657	3,839	1.5
<u>Averages</u>	6,163	3,756	1.6
<u>20 Years</u> <u>(1953-72)</u> <u>averages</u>	6,008	3,739	1.6

TABLE III

ANTELOPE HERD COMPOSITION

Year	Bucks	Does	Fawns	Total	Per 100 Does	
					Bucks	Fawns
1973	464	1,582	413	2,459	29	26
1972	554	2,004	747	3,305	28	37
1971	584	1,692	498	2,774	35	29
1970	483	1,521	715	2,719	32	48
1969	292	1,138	562	1,992	26	49
1968	308	1,265	509	2,068	24	40
1967	285	917	290	1,492	31	32
1966	298	1,029	436	1,763	31	40
1965	269	879	343	1,491	31	39
1964	412	854	432	1,698	48	51
1963	355	887	581	1,823	40	66
1962	321	785	452	1,558	41	57
1961	214	770	347	1,331	28	45
1960	326	942	555	1,823	35	59
1959	393	806	361	1,560	50	45
1958	274	711	551	1,536	39	77
1957	203	608	493	1,304	33	81
1956	236	542	320	1,098	44	59
1955	194	455	268	917	43	59
1954	350	730	477	1,557	48	65
1953	417	950	589	1,956	44	62
1952	419	952	470	1,841	44	49
1951	334	694	417	1,445	48	60
1950	371	612	555	1,538	63	91

TABLE IIIa

1973 ANTELOPE HERD COMPOSITION

Area	Game District	Antelope Classified				Bucks Per 100 Does			Fawns Per 100 Does		
		Bucks	Does	Fawns	Total	1973	1972	*Ave.	1973	1972	*Ave.
Beatys Butte	Harney	43	213	48	304	20	27	28	23	31	39
Beulah	Malheur	7	23	5	35	30	18	20	22	29	38
Juniper	Harney Lake	36	85	16	137						
		8	42	10	60						
Total		44	127	26	197	35	20	35	20	37	35
Malheur	Harney Malheur	12	35	8	55						
		21	39	6	66						
Total		33	74	14	121	45	42	31	19	56	40
Maury	Ochoco	13	12	0	25	-	20	31	-	23	30
Murderer's Cr.	Grant	80	73	42	195	110	47	43	58	103	82
Ochoco	Ochoco	44	109	73	226	40	29	31	67	61	46
Owyhee	Malheur	9	40	10	59	23	39	21	25	24	24
Paulina-Wagontire	Deschutes	25	132	13	170	19	28	25	10	27	35

*Five-year average - 1968-1972

TABLE IIIa

1973 ANTELOPE HERD COMPOSITION
(Continued)

Area	Game District	Antelope Classified				Bucks			Fawns		
		Bucks	Does	Fawns	Total	Per 100 Does			Per 100 Does		
						1973	1972	*Ave.	1973	1972	*Ave.
Ft. Rock-Silver Lake	Lake	19	57	14	90	33	22	-	24	49	-
Silvies	Harney	7	24	8	39						
	Ochoco	55	177	41	273						
Total		62	201	49	312	31	10	19	24	27	33
Steens Mtn.	Harney	17	157	29	203	11	52	44	18	35	46
Warner	Lake	36	139	22	197	26	13	23	16	30	39
Whitehorse	Harney	6	28	4	38						
	Malheur	26	197	64	287						
Total		32	225	68	325	14	22	24	30	26	36
TOTALS AND AVERAGES		464	1,582	413	2,459	29	28	**32	26	37	**42

*Five-year average - 1968-1972

**Ten-year average - 1963-1972

TABLE IV

1973 ANTELOPE SEASON

(77% Return)

Management Units	Tags Issued	Report Cards Received	Number Did not Hunt	Number Hunted	Reported Harvest	Percent Success	Hunter- Days
Beulah	75	62	0	62	46	74	139
Fort Rock- Silver Lake	25	16	0	16	7	44	36
Hart Mountain	160	131	6	125	69	55	303
Interstate (Lake Cty)	50	40	0	40	20	50	100
Juniper	125	98	7	91	57	63	208
Malheur	150	112	4	108	74	69	219
Maury	75	59	6	53	19	36	149
Murderer's Creek	15	11	1	10	10	100	13
Ochoco	50	35	0	35	19	54	93
Owyhee	150	108	5	103	40	39	341
Paulina-Wagontire	125	100	4	96	36	38	269
Silvies	75	60	2	58	34	59	154
Steens Mountain	160	124	7	117	59	52	296
Warner	115	89	2	87	33	38	250
Whitehorse	250	188	6	182	101	55	467
Nat. Antelope Refuge	15	15	0	15	13	87	30
TOTALS	1,615	1,248	50	1,198	637	53	3,067
Gerber Res. Archery	65	38	4	34	2	6	153

Estimated total harvest - 749

Figure 1

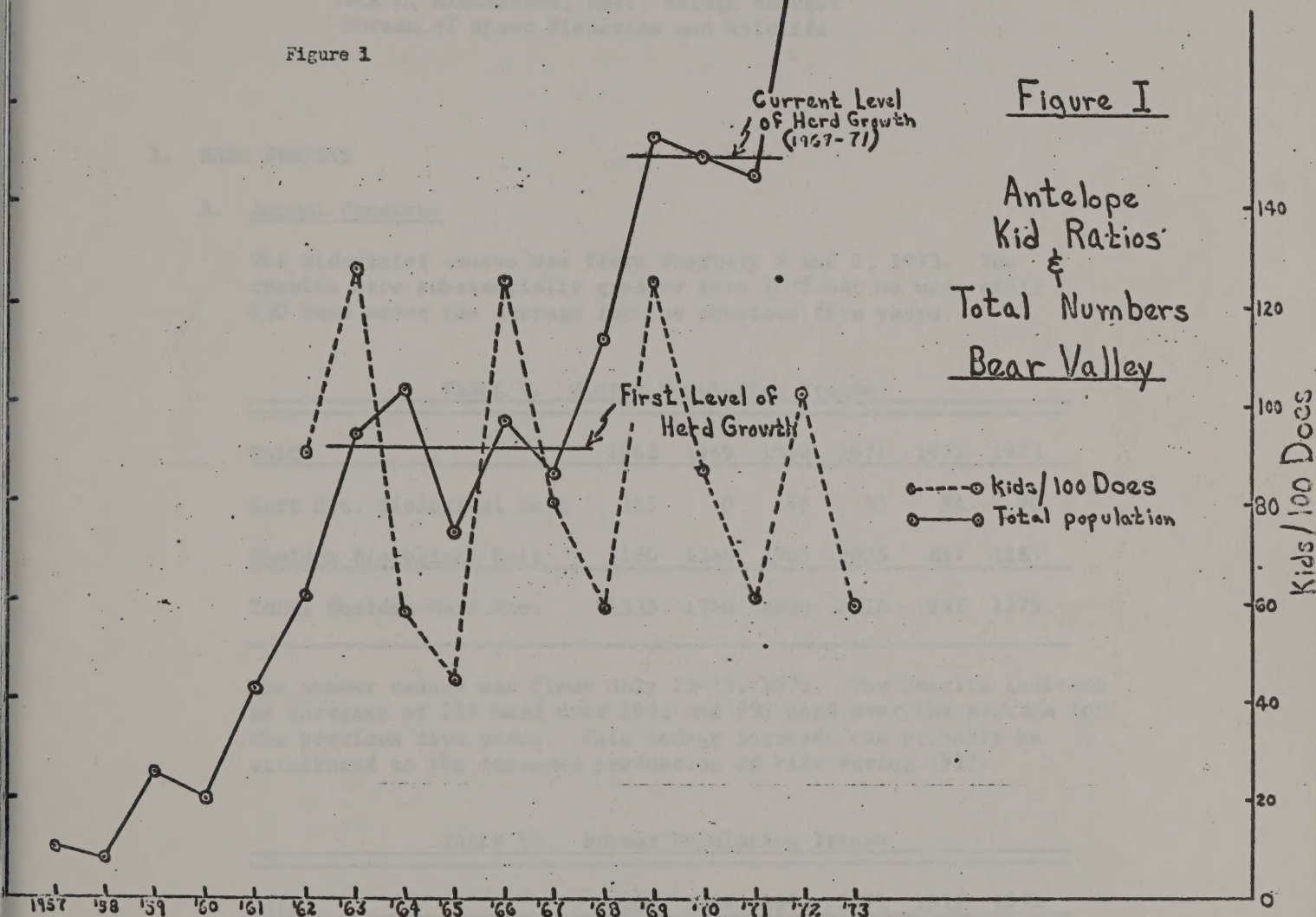
Figure I

Antelope
Kid Ratios
&
Total Numbers
Bear Valley

---○ Kids/100 Does
—○ Total population

Kids/100 Does
140
120
100
80
60
40
20
0

Year



1973 ANTELOPE STATUS REPORT

SHELDON-HART MOUNTAIN NATIONAL ANTELOPE REFUGES & CHARLES SHELDON ANTELOPE RANGE

Jack L. Richardson, Asst. Refuge Manager
Bureau of Sport Fisheries and Wildlife

I. HERD SURVEYS

A. Annual Censuses

The mid-winter census was flown February 8 and 9, 1973. The results were substantially greater than 1972 but we were still 230 head under the average for the previous five years.

TABLE I. Winter Population Trends

Unit	1968	1969	1970	1971	1972	1973
Hart Mtn. Biological Unit	155	0	95	85	84	90
Sheldon Biological Unit	1180	1340	1705	2025	857	1185
Total Sheldon-Hart Mtn.	1335	1340	1800	2110	941	1275

The summer census was flown July 23-25, 1973. The results indicate an increase of 256 head over 1972 and 235 head over the average for the previous five years. This modest increase can probably be attributed to the improved production of kids during 1972.

TABLE II. Summer Population Trends

Unit	1968	1969	1970	1971	1972	1973
Hart Mtn. Biological Unit	432	178	508	310	454	646
Sheldon Biological Unit	523	949	1060	874	728	792
Total Sheldon-Hart Mtn.	955	1127	1568	1184	1182	1438

B. Buck-Doe Ratios

The following herd ratios were obtained during late July, 1968-1973.

TABLE III. Summer Herd Ratios

	1968	1969	1970	1971	1972	1973
Number Classified	952	1127	1568	1184	1182	1423
Bucks	207	319	351	299	261	265
Does	609	635	799	794	667	925
Kids	136	173	418	91	254	233
Bucks/100 Does	34	50	44	38	39	29
Kids/100 Does	22	27	52	11	38	25

The 1973 buck/doe ratio is the lowest recorded since accurate censusing was started in 1955. The ratio is also 12 below the average for the previous five years.

C. Production

The 25 kids per 100 does recorded in 1973 was 13 below 1972 and five below the average for the previous five years. The ratio was 26 below the average for the previous 18 years. Since 1965 only one year, 1970, has had a ratio exceeding the average.

D. Harvest

Hunting continued on both Hart Mountain and Sheldon Range during 1973.

Hunts have been held on Sheldon since 1967. During the seven seasons 119 hunters have bagged 112 bucks for an overall success rate of 94%. Boone and Crockett scores of the green heads have ranged from 45-1/8 to 86-2/8 with an average of 72. The following table summarizes each of the seasons.

TABLE IV. Summary of Sheldon Antelope Hunts

Year	No. Hunters	Successful	% Success	Boone & Crockett Scores		
				High	Low	Average
1967	10	10	100	75-5/8	45-1/8	69-2/8
1968	10	10	100	81-2/8	64-2/8	73-6/8
1969	20	20	100	78-4/8	64-3/8	70-3/8
1970	20	17	85	86-2/8	57-4/8	72-5/8
1971	19	18	95	81-4/8	46-6/8	73-5/8
1972	20	17	85	80-4/8	63-1/8	71-4/8
1973	20	20	100	84-	59-2/8	72-6/8

Hunts were started on Hart Mountain in 1968. During the six seasons 86 hunters have bagged 78 bucks for an overall success rate of 91%. Boone and Crockett scores of the green heads have ranged from 53 to 81-6/8 with an average of 70-7/8. The following table summarizes each of the seasons.

TABLE V: Summary of Hart Mountain Antelope Hunts

Year	No. Hunters	Successful	% Success	Boone & Crockett Scores		
				High	Low	Average
1968	10	9	90	82	65-6/8	74-5/8
1969	16	15	94	77-6/8	64-2/8	70-3/8
1970	15	15	100	81-6/8	65-2/8	73
1971	14	11	79	75	65-4/8	69-4/8
1972	15	15	100	78-4/8	53	69-7/8
1973	16	13	81	79	57-4/8	68-4/8

II. RANGE SURVEYS

A. Weather Conditions

Although we started the year with near normal snowpacks, precipitation following spring runoff was far below average. As a result, forage was essentially desiccated by July 1.

Above average precipitation was received during late fall and early winter. Temperatures late in the year were unseasonably warm, however. As a result, soil moisture at year's end is excellent but snowpacks are far below average.

B. Range Modification

Lack of funds, restrictive manpower ceilings and the upward spiral of inflation combined to bring our range improvement program to an almost complete halt. Our only accomplishments besides maintenance of former improvements were the construction of three waterholes and one reservoir on Hart Mountain. The areas burned in 1972 were fenced during early spring to exclude livestock use.

C. Range Evaluation

As stated above, early precipitation was lacking in 1973. As a result, forage became desiccated earlier than usual forcing antelope onto browse by early July.

III. MISCELLANEOUS EVALUATIONS

A. Disease

None noted.

B. Predation

No evidence of predation was found. There has been no predator control on these areas since 1967.

C. Tagging

None.

D. Research

As reported last year, the first phase of the research project entitled "An Evaluation of the Dispersion of Pronghorn Antelope in Relation to Plant Communities" was completed during 1972. To date, the thesis covering this work has not been completed. Lack of funds prevented continuation of the project during 1973.

Stomach samples were collected during the hunting seasons but no analysis has been made.

As an item of interest, Figure 1 is included at the end of this report. No conclusions are being presented at this time.

IV. SUMMARY OF DATA

- A. Census data continues to show fluctuations in population from year to year. Analysis of past data indicates a relatively stable population for the past 20 years, however.
- B. Kid survival continues below the 1955-1973 average and the buck ratio is the lowest recorded during the period.
- C. A total of 33 bucks were taken by 36 hunters for a success rate of 92%.
- D. Forage was desiccated earlier than usual.

V. RECOMMENDATIONS

A. Hunts

No changes are proposed for 1974.

B. Predator Control

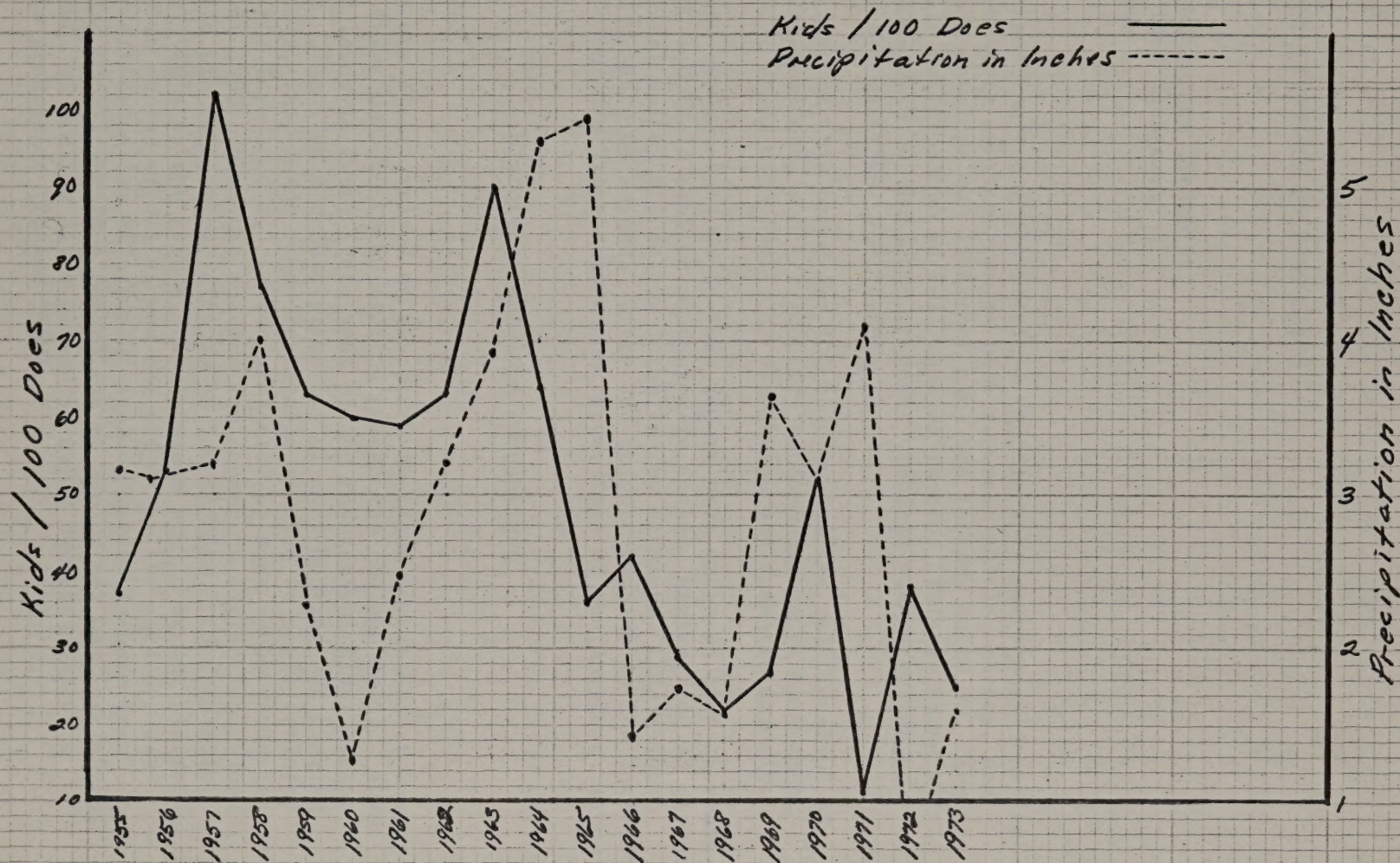
Continue policy of no control unless specific problems become apparent.

C. Research

Lack of funds will prevent any formal research in 1974.

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Fig. 2. Comparison of Antelope Production & May+June Precipitation
Sheldon - Hart Mtn. Herd



Note: Antelope production was low in 1971 as a result of deep snows.

Precipitation 1955-1971 is average of Hart Mtn. & Sheldon, 1972-1973 is Hart Mtn. only.

ANTELOPE AND LIVESTOCK ON RANGELANDS

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Today the American pronghorn antelope (Antilocapra americana) inhabits the western North American ranges with domestic cattle, horses, and sheep. Both antelope and livestock can, and in many cases do, live in a compatible relationship on well managed ranges. This is especially true on lands with an abundance of water combined with a quality mixture of grass, forbs, and browse.

The objectives of this paper are (1) to document the relationships of antelope to livestock, and (2) identify recommended range management practices for areas used dually by pronghorns and domestic animals.

Findings and recommendations in this report were gathered over 21 years of research and field studies conducted in Canada, Mexico, and 13 of the 16 continental United States now inhabited by antelope. The author has relied heavily on Federal, State and private reports in the Interstate Antelope Conference Transactions and Proceedings of the Antelope States Workshops.

History of Antelope Populations

Past History

When white man first arrived on the North American continent, it was estimated there were 40 to 60 million pronghorns (Nelson 1925). These herds were found in every State west of the Mississippi River except Washington. Then, as a result primarily of over-hunting and plowing of grasslands, vast herds were drastically reduced to small isolated groups by the late 1800's. It was predicted by some conservationists in the early 1900's that the species was doomed to extinction unless man reversed his deleterious effects on the species. Consequently, during the 1920's to the 1950's, the American public became alarmed at their loss in native wildlife, and the plight of the antelope was reversed. Effective law enforcement against indiscriminate year long hunting of all antelope regardless of age or sex was instigated, and thousands of prairie acres plowed by early homesteaders were returned to grasslands (Yoakum 1968).

Presented at Annual Meeting, Society Animal Sciences, Blacksburg, Virginia, July 1972.

The effectiveness of this change in the antelope's plight can be realized by comparing populations in 1924 (estimated 26,600) and 1964 (estimated 364,000) for the United States. During this 40 year period the population increased over 1,000 percent and concurrently provided citizens with more than a million recreation days of hunting (Yoakum 1968).

Present Situation

Today there is no fear of extinction for the pronghorn for they are now found in every continental State west of the Mississippi River including the State of Washington (Figure 1). Although not in the abundant numbers witnessed during pristine times, today's population is in a good, healthy condition.

The highest density of antelope (number per mile square) is in central and northeastern Wyoming. Most of these antelope inhabit private rangelands covered by shortgrass prairie-low sagebrush stands with good water distribution (Colorado State University 1969). In addition to antelope, horses, cattle and domestic sheep currently graze these historic antelope ranges of yesterday, the center of the pronghorn's worldwide distribution today.

Although pronghorns currently inhabit all the western States, 68 percent of the total population exists in the shortgrass areas of Montana, Wyoming, the Dakotas, Colorado, and New Mexico; 31 percent in Oregon, California, and Idaho; and about 1 percent in remaining States having hot and cold deserts.

Recent studies (Yoakum 1972) linking antelope densities with vegetational communities are summarized in Table 1. It is apparent that high antelope numbers are related to grassland communities.

Antelope Habitat Requirements

To better understand the relationships of pronghorns to livestock, it is imperative to know each animal's requirements for range characteristics (forage, water, space, etc.). Although these are well known for livestock, they are not for antelope. Table 2 lists antelope requirements as developed to date for a sagebrush-grassland community.

These requirements must be available in the correct combination. It is not sufficient to have an over abundance of one component and an inadequate quantity of another; nor can there be a total lack of any one.

Some ranges produce and maintain more antelope per land area than adjacent ranges because of the combination of habitat characteristics.

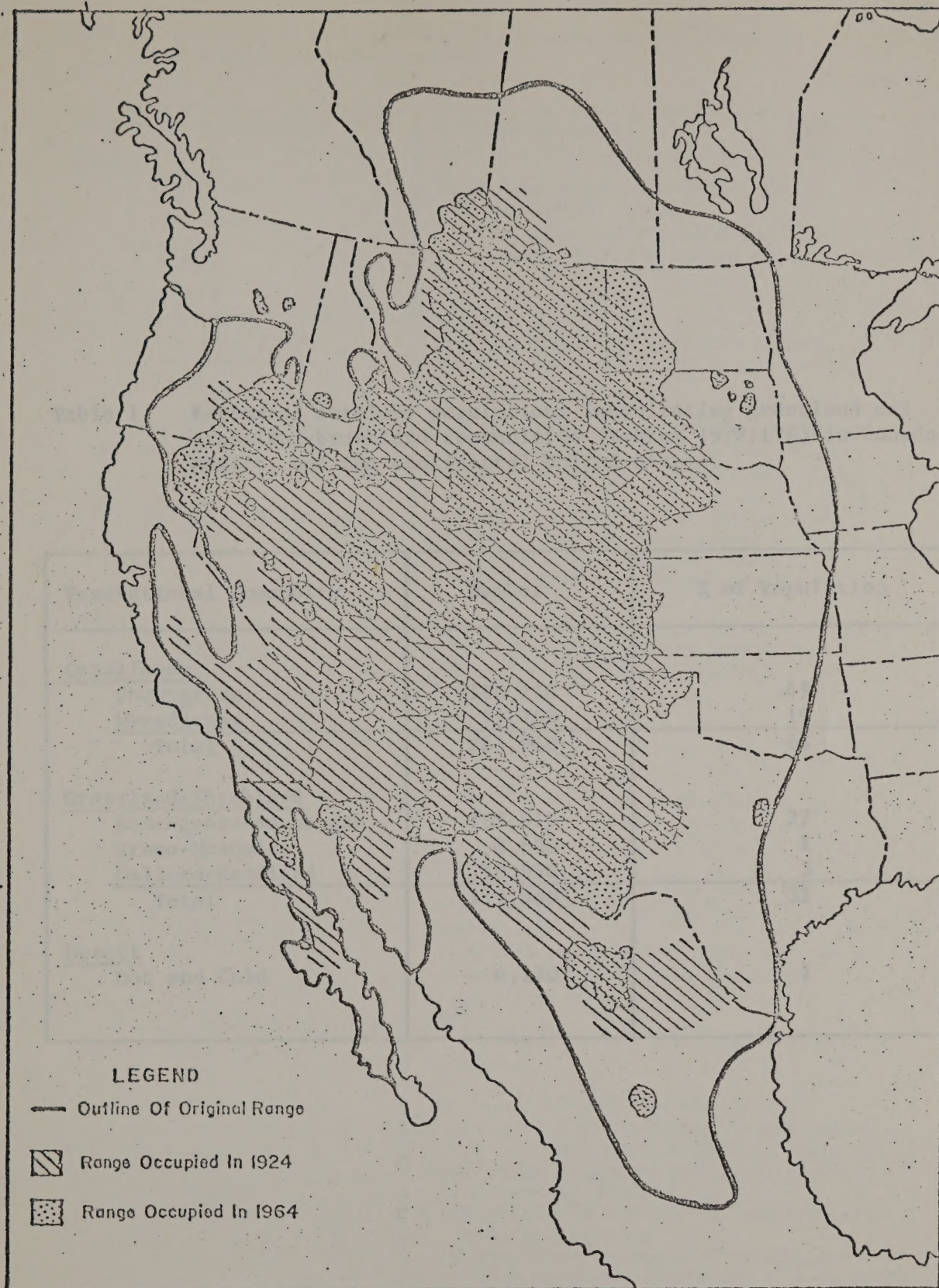


Figure 1. Past and present distribution of the American pronghorn antelope in North America. Information relative to the "original" distribution and range occupied in 1924 adapted from Nelson 1925:2.

Table 1. Distribution of antelope populations by habitat in a grassland-woodland community.

Vegetational Community	Number	% of Population
<u>Grasslands</u>		
Shortgrass	190,210	49
Mixedgrass	71,750	19
Total	261,960	68
<u>Grassland-Shrubland</u>		
Bunchgrass-Sagebrush	103,810	27
Grama-Mesquite	4,600	1
Galleta-Woodland	10,950	3
Total	119,360	31
<u>Desert</u>		
Hot and Cold	4,170	1

Table 2. Checklist of pronghorn antelope requirements for habitat in a grassland-sagebrush community.

HABITAT CHARACTERISTICS	ANTELOPE REQUIREMENT ^{1/}
<u>ABIOTIC</u>	
1. Physiography	Large expanse area (10 miles minimum) - low rolling terrain - no major physical barriers (large rivers, mountain ranges, etc.)
2. Climate	10-15" Not over 10-15" for prolonged periods Not a factor--populations in hot deserts to alpine meadows
- precipitation	
- snow depth	
- temperature	
3. Soils	Not a determining factor except to soil-site relationships in which some sites do not grow the right vegetation
4. Water	Desirable to have one quarter to one gallon per day for every day of year, particularly warm seasons. Water distribution every 3 to 4 miles
<u>BIOTIC</u>	
1. Vegetation	Ground cover--most ranges have around 50% vegetation: 50% non-vegetation Composition: 40-60% Grass 10-30% Forbs 5 10% Browse Variety: Grass - 5 to 10 species Forbs - 20 to 40 species Browse - 5 to 10 species Succulence: The more available year round the better in all plant species Communities: Variety and diversity important (meadows, intermittent lake beds, wild fire burns, etc.) Height: No higher than 24"; preferably from 12-24"
2. Animal	Big game: Tolerable of all species Predators: Affect antelope to some extent, but rarely a limiting factor Man: Can or cannot be problem based on two major factors: - Effective enforcement of indiscriminate year long killing - Methods and practices of habitat or range management (Maintaining or improving vegetation, waters, fences, etc.)

^{1/} These requirements must be available in the right combinations. Too much or too little of any one may become the major factor limiting antelope production or survival.

Antelope-Livestock Coexistence

Few studies have been reported regarding antelope-livestock compatibility and these vary greatly in their findings (Einarsen 1948, Hoover et al 1959, Buechner 1950, Hjersman and Yoakum 1958, Campbell 1972, and Becker 1972). Most agree that antelope show no aversion to feeding with cattle, but question the possibility of competition for forage between pronghorn and domestic sheep. However, Severson et al (1968:36) conducted an in-depth study of competition between antelope and domestic sheep on the same range. They stated: "Antelope and sheep appeared to be compatible. There was no evidence of any stress placed on populations of either antelope or sheep as a result of the presence of the other species."

Compatibility appears to be related to the number of animals using the same ranges and the condition of forage. If a reasonable number of each class of animal is using the range with no detrimental affect on the vegetation, soil, or water, dual use can be advantageous because most livestock (sheep would be an exception) tend to graze primarily grasses, whereby antelope mainly consume forbs and browse.

There likewise appears to be little or no problem of tolerance, stress, or behavioral characteristic between antelope and livestock. Each reproduces and survives well on the same ranges. Both graze together and utilize the same waters. It is conjectured that domestic cattle today have merely replaced the buffalo of yesterday on the western ranges used concurrently with antelope.

Studies regarding the possibility of disease and/or parasite transfers between pronghorns and livestock disprove this as a serious threat or problem to date (Yoakum 1957, DeArment 1965). An exception would be where a high frequency of internal parasites occurred in domestic sheep using the same range as antelope (Bever 1955, Buechner 1950). Higher parasitic antelope-sheep relationships appear to occur more frequently on ranges in deteriorated condition. Reasons for the notable lack of either diseases or parasites in antelope include: (1) continued movement in foraging habits, (2) non-frequent use of high moisture areas, and (3) lack of year long concentration of large animal groupings.

Problems and Recommended Practices

Forage

Maintain native vegetation. Antelope reproduce and survive best on native ranges with (1) a diversity of vegetative types, (2) an abundance of grass, forbs, and browse on a year long basis, and (3) vegetation averaging in height from 12 to 24 inches. Table 2 shows specific antelope habitat requirements.

Although antelope prefer native range, they seek and heavily graze alfalfa (Medicago sp.) fields during summer months (Cole 1956). Generally speaking, other cultivated crops, such as winter wheat, are not readily consumed, although some high use has been documented for the early growing season (Cole and Wilkins 1958).

Improvement practices. Intensive farming practices, such as the wheatlands in the Great Plains States or the vegetable and fruit croplands of California's central valley, have eliminated millions of acres of historic range for antelope. These lands in pristine conditions supported highest antelope densities. Conversion of so much historic habitat is one major reason why pronghorn numbers today will remain less than one percent of what they were prior to 1800.

Range improvement practices, such as weed control, brush manipulation, prescribed burning, type conversions, and single-species or mixture seedings, may be advantageous or deleterious to pronghorns--depending on how the projects are planned and accomplished. In general, a range dominated by one plant species or growing vegetation higher than 24 inches is of low carrying capacity for antelope. Converting these vegetative types to a variety of grasses, forbs, and browse with growing characteristics less than 24 inches high could result in a habitat more favorable to antelope. Type conversion practices such as plowing, disking, or chemical spraying, often result in the severe reduction or elimination of broad-leaved native plants; consequently, they can be detrimental to antelope habitat. There are other techniques of vegetative type conversion, such as chaining or cabling, which when well planned and accomplished properly, can decrease the percentage of undesired plants yet not adversely affect desired species (Plummer et al 1968, and Cain 1971). Mechanical type conversion usually must be followed with seedings. It is desirable to seed a mixture (Cain 1973) of a minimum of 6 grass species, 6 forb species, and 6 browse species adapted to the site. Native species capable of extending the season of available succulent vegetation are preferred. Single-species seedings do not provide the variety of succulence listed in Table 2 that is desired for quality antelope habitat.

Water

Since pronghorn densities are highest on well watered ranges (Sundstrom 1968), the availability of water every mile would be desirable even though the animals would satisfy their demands if water was present at least every three to four miles. Natural water such as streams, ponds, springs, and lakes are used by antelope and such sources of water should be maintained as much as possible. Antelope readily use man-made water developments such as reservoirs, troughs, or water catchments.

The installation of precipitation catchment facilities on ranges lacking proper water distribution have been successful for antelope (June 1965). Such water developments are relatively maintenance free, not too expensive, and serve a variety of wildlife. A 30-inch high barbed wire fence should be constructed around the projects to protect the facility from trampling damage or competition for use of water by cattle or horses.

For antelope with a home range of five miles or less, it is important that water is available somewhere within the home range at all seasons of the year, especially during the dry summer and fall months.

Antelope have problems jumping or going through fences because, historically, the habitat in which they developed contained no obstacles over which they had to jump. Fences become a major obstacle when antelope mobility is needed to procure food, water, or escape from deep snows. Such restrictions have led to mortality in certain areas.

Recommendations from antelope-fence studies conducted today (Spillett et al 1967, Zobell 1968, Mapston 1972, Interstate Antelope Conference 1962) state that when fence construction is necessary, the following specifications are best for antelope welfare:

1. Net-wire fences are generally barriers; therefore, their construction on antelope ranges is discouraged.
2. Barbed wire fences should be constructed to the following specifications:
 - bottom wire at least 16" from ground
 - next wire up 10"
 - next wire up 10", comprising a total of 36" height from ground
 - bottom wire should be smooth wire, for antelope generally go under fences
 - no stays between posts, as this allows for a less tight fence
 - important antelope travelled pathways, migration routes, etc. should allow for low-height or lay down panels, or pass structures
 - keep fenced areas as large as possible, thereby providing an opportunity for antelope to obtain all the basic habitat requirements listed in Table 2.

Discussion

It is apparent the overwhelming majority of pronghorns coexist today with domestic livestock on western rangelands. Where range conditions are good (sufficient quality and quantity of available forage, waters and living space), both animal classes are compatible; but, on deteriorated ranges there are frequently competition problems. It, therefore, is not a question of whether livestock or antelope can or should exist on rangelands, but how can or should the range manager manage the lands to meet the concurrent biological requirements of both antelope and livestock.

It would be folly to try to set up an example of good range management principles and practices for cohabitation of antelope and livestock for all western ranges. But, some basic principles can be applied that should provide recommended guidelines. Therefore, a model has been provided in Figure 2. This example depicts (1) a rangeland concurrently used by livestock and antelope but lacking optimum forage and water production, and (2) the same area with recommendations how forage and water developments could improve the carrying capacity for livestock and pronghorns.

Summary

The majority of the American pronghorn antelope coexist with domestic livestock in each of the western United States. It is postulated that cattle today have replaced buffalo of yesterday as a companion grazer to antelope.

Competition for forage or water is generally not a problem on ranges in good condition, but can be on ranges in deteriorated condition. Rangelands with the following characteristics are preferred ranges for both livestock and antelope: low rolling terrain; vegetation predominately grass, when forbs and browse in abundance; water available every three miles.

Antelope thrive best on rangelands with a diversity of vegetation, an abundance of grass-forbs-browse, plants with high succulence, and growth height from 12 to 24 inches. Cultivated crops usually are not consumed extensively except alfalfa which is highly preferred.

Vegetational type manipulation projects can be advantageous or deleterious to antelope depending on how they are planned and accomplished. Should a range not have the vegetational ground cover preferred by antelope and conversion could accomplish this objective, then the project could be beneficial. Single-species range seedings are not desirable.

It is apparent the overwhelming majority of rangeland owners today with domestic livestock on western rangelands. Where range conditions are good (sufficient quality and quantity of available forage, water and living range), both animal classes are manageable; but, in deteriorated ranges there are frequently vegetation problems. It is not a question of whether livestock or antelope can or should exist on rangelands, but how can we provide the range manager enough the land to meet the concurrent biological requirements of both antelope and livestock.

It would be better to try to set up an example of good range management principles and practices for conservation of antelope and livestock for all western ranges. But, some basic principles can be applied that would provide recommended guidelines. Therefore, a model has been provided in Figure 1. This example depicts (1) a rangeland conceptually used by livestock and antelope but having optimum forage and water production, and (2) the same area with recommendations how forage and water development could improve the carrying capacity for livestock and antelope.

Summary

The majority of the American rangeland antelope herds with domestic livestock in each of the western United States. It is pointed out that cattle today have replaced bighorn of yesterday as a companion grazer to antelope.

Exaggerated for forage or water is generally not a problem on ranges in good condition, but can be as ranges in deteriorated condition. Rangelands with the following characteristics are preferred ranges for both livestock and antelope: low rolling terrain; vegetation predominantly grass; open forage and browse in abundance; water available every three miles.

Antelope thrive best on rangelands with a diversity of vegetation, an abundance of grass-forbs-browse, plants with high succulence, and growth height from 12 to 24 inches. Cultivated crops usually are not consumed extensively except alfalfa which is highly preferred.

Vegetational type and distribution problems can be advantageous in determining to antelope depending on how they are planned and manipulated. Should ranges that have the vegetational ground cover protected by antelope and conversion could accomplish this objective, then the present could be beneficial. Single-species range seedings are not desirable.

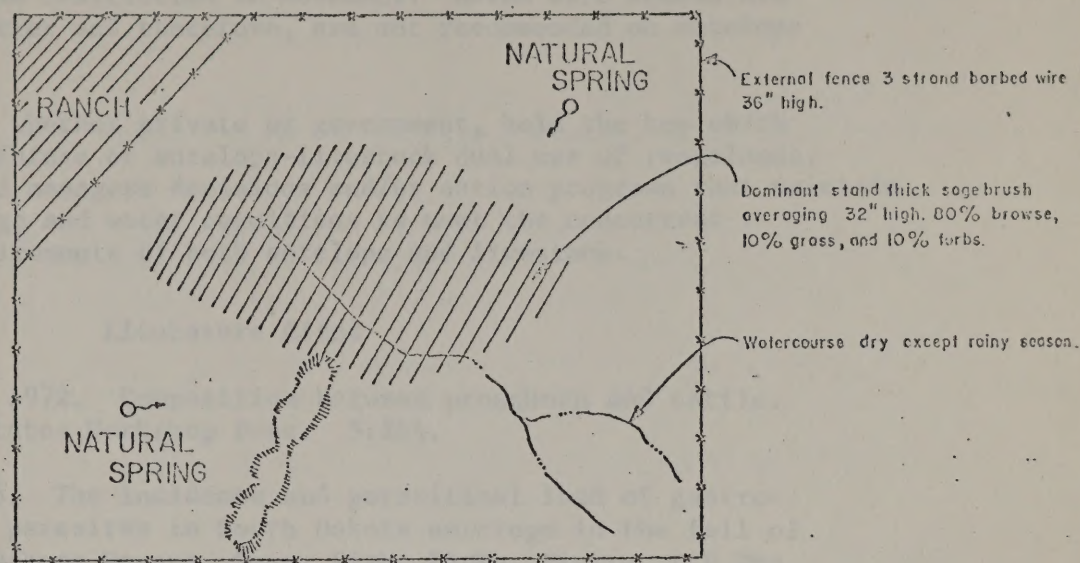
Figure 2.

Model of a rangeland concurrently used by antelope and cattle with illustrations of before and after range improvements have been designed and implemented to increase the carrying capacity for both classes of animals.

A. Rangeland prior to range improvements.

Characteristics:

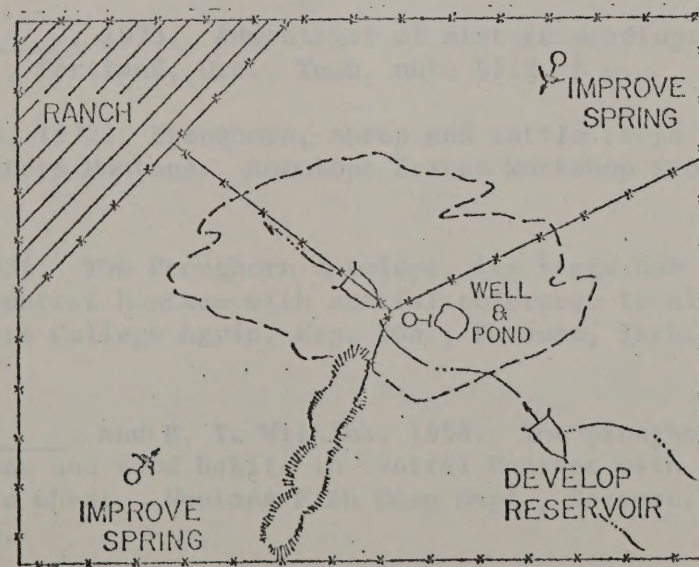
1. Low rolling topography
2. Waters only available as diagramed.
3. Vegetation native bunchgrass-sagebrush community unless noted otherwise. 20% forbs, 15% browse, and 65% grass; height 15" to 20".



B. Rangeland following planned range improvements.

Improvements:

1. Institute intensive livestock grazing system with 3 pastures used on rest rotation principles.
2. Develop waters:
 - 2 Springs
 - 1 Well with pipeline to pond
 - 2 Reservoirs



3. All constructed fences to be no higher than 36" with wires from ground 16", 10", and 10".
4. Chain dominant sagebrush type. Chain once, then aerially seed a mixture of 6 grasses, 6 forbs, and 6 browse adaptive to site. Then rechain again to cover seed.

C. Summary

Objectives are:

1. Vegetative ground cover to approximate percentages of 65% grass, 20% forbs, and 15% browse.
2. Waters available all seasons of year at every three miles.

Pronghorn densities are best on range where water is available every three to four miles. Antelope use man-made water developments such as reservoirs, troughs, and water catchments. These developments can improve the carrying capacity of the ranges.

Fences which restrict antelope movement for habitat requirements can be detrimental. However, properly designed barbed wire fences provide a minimum restriction to movement. Woven wire fences are generally a barrier and therefore, are not recommended on antelope ranges.

Range managers, whether private or government, hold the key which determines the future of antelope-livestock dual use of rangelands. This is the land managers decisions and/or action programs that maintain or improve forage and water conditions to meet the concurrent biological requirements of both antelope and livestock.

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